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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,602	08/16/2006	Hiroyuki Kyushima	46884-5500	2693

55694 7590 05/19/2009

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EXAMINER	
HOLLWEG, THOMAS A	

ART UNIT	PAPER NUMBER
2879	

MAIL DATE	DELIVERY MODE
05/19/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/589,602	KYUSHIMA ET AL.	
	Examiner	Art Unit	
	Thomas A. Hollweg	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 August 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/16/2006, 6/11/2008, 7/31/2008, 1/5/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Preliminary Amendment

1. Applicant's Preliminary Amendment, filed August 16, 2006, is acknowledged. Claims 19-22 are added. Claims 1-22 are currently pending.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on August 16, 2006, June 11, 2008, July 31, 2008 and January 5, 2009 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

3. The information disclosure statement filed November 8, 2006, fails to comply with 37 CFR 1.98(a)(1), which requires the following: (1) a list of all patents, publications, applications, or other information submitted for consideration by the Office; (2) U.S. patents and U.S. patent application publications listed in a section separately from citations of other documents; (3) the application number of the application in which the information disclosure statement is being submitted on each page of the list; (4) a column that provides a blank space next to each document to be considered, for the examiner's initials; and (5) a heading that clearly indicates that the list is an information disclosure statement. The information disclosure statement has been placed in the application file, but the information referred to therein has not been considered.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Claim 8 claims that "said electron

multiplier section… being fixed to the flat part in said glass substrate" however, the figures show the electron multiplier section (31) fixed to the bottom part (301a) of the depression (301) of the silicon substrate (30) and not to the glass substrate. As written, the claim indicates that the electron multiplier section and glass substrate are fixed directly to one another.

5. Therefore, the electron multiplier section fixed to the glass substrate must be shown or the feature(s) canceled from the claim(s), **OR**, this claim term will be interpreted to allow the electron multiplier section to be fixed to another component and therefore indirectly fixed to the glass substrate. No new matter should be entered.

6. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

7. The following claims are objected to because of the following informalities:

a. Claim 2 is objected to because it is unclear whether "a lower frame comprised of a glass substrate" is the same glass substrate described in claim 1 where “at least part is constructed by a glass substrate” or whether it is describing an additional glass substrate. The claim will be read such that the glass substrate of claim 2 is the same as the glass substrate of claim 1.

b. Claim 3, the phrase “arranged on the flat part in said glass substrate” implies that the electron multiplier and the anode are within the glass substrate. This phrase will be interpreted to mean that these components are on the glass substrate.

c. Claim 12, the phrase “said side wall frame has with a transmitting window” is awkward.

d. Claim 13 is dependent on claim 2. Claim 13 includes the step of “preparing a lower frame,” “preparing a sidewall” and “preparing an upper frame.” It is assumed that these are references to the lower frame, the sidewall and the upper frame of claim 2.

e. Claim 14, reference to the lower frame, the side wall and the upper frame in the “preparing” step should make reference with a “the” or “said” instead of an “a” or "an.”

Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-6, 10, 11, 14 and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Then et al., U.S. Patent No. 5,568,013 (cited by applicant).

10. **With regard to claim 1,** in figures 13-17, Then discloses a photomultiplier comprising: an enclosure (80) having an inside kept in a vacuum state, said enclosure whose at least part is constructed by a glass substrate (98) having a flat part; a photocathode (90), accommodated in said enclosure (80), emitting a photoelectron to the inside of said enclosure in response to light captured through said enclosure; an electron multiplier section (16), arranged on a predetermined area of the flat part in said glass substrate (98), for multiplying in a cascading manner the photoelectrons emitted from said photocathode; and an anode (104), arranged on an area excluding the area where said electron multiplier section (16) is arranged on the flat part in said glass substrate (98), for taking out electrons having arrived thereat among electrons multiplied

in a cascading manner in said electron multiplier section (16) as a signal (col. 6, line 62 – col. 7, line 36).

11. **With regard to claim 2,** in figures 13-17, Then discloses that said enclosure (80) comprises a lower frame comprised of a glass substrate (98); an upper frame (86) opposing said lower frame; and a side wall frame (40), provided between said upper frame (98) and said lower frame (86), having a form surrounding said electron multiplier section (16) and said anode (104) (col. 6, line 62 – col. 7, line 36).

12. **With regard to claim 3,** in figures 13-17, Then discloses that said electron multiplier section (16) and said anode (104) are arranged on the flat part in said glass substrate (98) while in a state separated by a predetermined distance from said side wall frame (40) constituting a part of said enclosure (80) (col. 6, line 62 – col. 7, line 36).

13. **With regard to claim 4,** in figures 13-17, Then discloses that said side wall frame (40) is comprised of a silicon material (col. 3, lines 48-61).

14. **With regard to claim 5,** in figures 13-17, Then discloses that said upper frame (86) is comprised of one of a glass material and silicon material (col. 7, lines 8-9).

15. **With regard to claim 6,** in figures 13-17, Then discloses that said electron multiplier section (16) is comprised of a silicon material (col. 3, lines 48-61).

16. **With regard to claim 10,** in figures 13-17, Then discloses that said upper frame (86) is comprised of a glass material (col. 7, lines 8-9); and wherein said upper frame (86) is joined to said side wall frame (40) such that said upper frame (86) and said lower frame (98) sandwich said side wall frame (40) therebetween (col. 7, lines 25-33).

17. The Examiner notes that the claim limitation "joined… by one of anode bonding and diffusion bonding" is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Then and Syms (see MPEP 2113). The Examiner notes further that Then discloses the limitation, "joined… by one of anode bonding and diffusion bonding" (col. 3, line 62—col. 4, line 8; col. 7, lines 28-31).fixed to the flat part in said glass substrate by one of anodic bonding and diffusion bonding.

18. **With regard to claim 11**, in figures 13-17, Then discloses that said upper frame (86) has a transmitting window for taking light into said enclosure (80) (col. 7, lines 8-9).

19. **With regard to claim 14,** in figures 13-17, Then discloses a method of manufacturing a photomultiplier comprising an enclosure (80) constructed by a lower frame (98), a side wall frame (40), and an upper frame (86), while having an inside kept in a vacuum state, a photocathode (90) accommodated in said enclosure (80), an electron multiplier section (16) accommodated in said enclosure (80), and an anode (104) at least partly accommodated in said enclosure (80), said method comprising the steps of: preparing a lower frame (98), comprised of a glass material, constituting a part of said enclosure (80); preparing a side wall frame (40), comprised of a silicon material, constituting a part of said enclosure (80); preparing an upper frame (86) constituting a part of said enclosure (80); and fixing said side wall frame to said lower frame by one of

anodic bonding and diffusion bonding (col. 3, line 48 – col. 4, line 8; col. 6, line 62 - col. 7, line 36).

20. **With regard to claim 19,** in figures 13-17, Then discloses a method according to said upper frame (86) is comprised of a glass material; and wherein said upper frame (86) is joined to said side wall frame (40) by one of anode bonding and diffusion bonding such that said upper frame and said lower frame (86) sandwich said side wall frame (40) therebetween (col. 6, line 62 - col. 7, line 36).

21. **With regard to claim 20,** in figures 13-17, Then discloses a method where said upper frame (86) is comprised of a silicon material (borosilicate); and wherein said upper frame (86) is joined to said side wall frame (40) by one of anode bonding and diffusion bonding such that said upper frame (86) and said lower frame (98) sandwich said side wall frame (40) therebetween (col. 6, line 62 - col. 7, line 36).

22. **With regard to claim 21**, in figures 13-17, Then discloses a method where said upper frame (86) is formed with a transmitting window for taking light into said enclosure (80) (col. 7, lines 8-9).

23. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Goodberlet et al., U.S. Patent No. 7,049,747 B1 (cited by applicant).

24. **With regard to claim 1**, in figures 4a-c, Goodberlet discloses a photomultiplier comprising: an enclosure having an inside kept in a vacuum state, said enclosure whose at least part is constructed by a glass substrate (460) having a flat part; a photocathode (340), accommodated in said enclosure, emitting a photoelectron to the inside of said enclosure in response to light captured through said enclosure; an

electron multiplier section (420), arranged on a predetermined area of the flat part in said glass substrate, for multiplying in a cascading manner the photoelectrons emitted from said photocathode; and an anode (450), arranged on an area excluding the area where said electron multiplier section (420) is arranged on the flat part in said glass substrate (460), for taking out electrons having arrived thereat among electrons multiplied in a cascading manner in said electron multiplier section as a signal.

Claim Rejections - 35 USC § 103

25. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

26. Claims 7-9, 13 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Then, as applied to claims 1 and 2 above, in view of Syms, U.S. Patent No. 7,294,954 B2 (cited by applicant).

27. **With regard to claim 7,** Then discloses all of the limitations, except it does not expressly disclose that said anode is comprised of a silicon material.

28. Syms, in figure 4a, teaches a photomultiplier having an anode (405) where the anode is comprised of a silicon material (col. 3, line 22; col. 7, lines 9-28; 405 having same hatching as silicon members 401 and 407).

29. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Then photomultiplier where said anode is comprised of a

silicon material, as taught by Syms, so that the anode can be constructed at the same time as the electron multiplier section.

30. **With regard to claim 8,** in figures 13-17, Then discloses that said electron multiplier section (16) is comprised of a silicon material (col. 3, lines 48-61), said electron multiplier section (16) and said anode (104) are fixed to the flat part in said glass substrate (98) (col. 6, line 62 – col. 7, line 36).

31. Then does not expressly disclose that said anode is comprised of a silicon material.

32. Syms, in figure 4a, teaches a photomultiplier having an anode (405) where the anode is comprised of a silicon material (col. 3, line 22; col. 7, lines 9-28; 405 having same hatching as silicon members 401 and 407).

33. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Then photomultiplier where said anode is comprised of a silicon material, as taught by Syms, so that the anode can be constructed at the same time as the electron multiplier section.

34. The Examiner notes that the claim limitation “fixed to the flat part in said glass substrate by one of anodic bonding and diffusion bonding” is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Then and Syms (see MPEP 2113). The

Examiner notes further that Then discloses the limitation, "fixed to the flat part in said glass substrate by one of anodic bonding and diffusion bonding" (col. 3, line 62—col. 4, line 8; col. 7, lines 28-31).fixed to the flat part in said glass substrate by one of anodic bonding and diffusion bonding.

35. **With regard to claim 9,** in figures 13-17, Then discloses that said electron multiplier section (16) and said sidewall frame (40) are comprised of a silicon material (col. 3, lines 48-61), said electron multiplier section (16), said anode (104) and said side wall frame (40) are fixed to the flat part in said glass substrate (98) (col. 6, line 62 – col. 7, line 36).

36. Then does not expressly disclose that said anode is comprised of a silicon material.

37. Syms, in figure 4a, teaches a photomultiplier having an anode (405) where the anode is comprised of a silicon material (col. 3, line 22; col. 7, lines 9-28; 405 having same hatching as silicon members 401 and 407).

38. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Then photomultiplier where said anode is comprised of a silicon material, as taught by Syms, so that the anode can be constructed at the same time as the electron multiplier section.

39. The Examiner notes that the claim limitation “fixed to the flat part in said glass substrate by one of anodic bonding and diffusion bonding” is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation.

Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Then and Syms (see MPEP 2113). The Examiner notes further that Then discloses the limitation, "fixed to the flat part in said glass substrate by one of anodic bonding and diffusion bonding" (col. 3, line 62—col. 4, line 8; col. 7, lines 28-31).fixed to the flat part in said glass substrate by one of anodic bonding and diffusion bonding.

40. **With regard to claim 13,** in figures 13-17, Then discloses a method of manufacturing the photomultiplier according to claim 2, said method comprising the steps of: preparing a lower frame (98), comprised of a glass material, constituting a part of said enclosure (80); preparing a side wall frame (40) constituting a part of said enclosure (80), said side wall frame being formed together with said electron multiplier section (16) by etching a single silicon substrate; preparing an upper frame (86) constituting a part of said enclosure (80); and fixing said side wall frame to said lower frame together with said electron multiplier section and said anode by one of anodic bonding and diffusion bonding (col. 3, line 48 – col. 4, line 8; col. 6, line 62 - col. 7, line 36).

41. Then does not expressly disclose that the anode is formed together with the side wall frame and the electron multiplier section.

42. Syms, in figures 4a-b and 5, teaches a method of forming a photomultiplier where the anode (405) is formed together with electron multiplier section (406) (col. 7,

lines 1-28; col. 7, line 55 – col. 8, line 18) because forming both elements together greatly simplifies that construction of the device.

43. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the with the method disclosed by Then, where the anode is formed together with the side wall frame and the electron multiplier section, as taught by Syms, because forming these elements together greatly simplifies that construction of the device.

44. **With regard to claim 15,** in figures 13-17, Then discloses a method where said upper frame (86) is comprised of a glass material; and wherein said upper frame (86) is joined to said side wall frame (40) by one of anode bonding and diffusion bonding such that said upper frame and said lower frame (86) sandwich said side wall frame (40) therebetween (col. 6, line 62 - col. 7, line 36).

45. **With regard to claim 16,** in figures 13-17, Then discloses a method where said upper frame (86) is comprised of a silicon material (borosilicate); and wherein said upper frame (86) is joined to said side wall frame (40) by one of anode bonding and diffusion bonding such that said upper frame (86) and said lower frame (98) sandwich said side wall frame (40) therebetween (col. 6, line 62 - col. 7, line 36).

46. **With regard to claim 17,** in figures 13-17, Then discloses a method where said upper frame (86) is formed with a transmitting window for taking light into said enclosure (80) (col. 7, lines 8-9).

47. **With regard to claim 18,** Then, disclose all of the limitations, as discussed in the rejection of claim 13 above, however, it does not expressly disclose that wherein said side wall frame is formed with a transmitting window for taking light into the enclosure.

48. One of ordinary skill would understand that light may enter the enclosure through any light transmitting surface as long as the light is incident on the photocathode. Whether the light is transmitted through the top substrate, bottom substrate or sidewalls is a matter of design choice.

49. At the time of invention, it would have been an obvious design choice for a person having ordinary skill in the art to construct the Then photomultiplier so that the side wall frame is formed with a transmitting window for taking light into the enclosure, as long as the light is incident on the photocathode.

50. **Claims 12 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Then, as applied to claims 4 and 14 above, in view of itself.**

51. **With regard to claim 12,** Then, disclose all of the limitations, as discussed in the rejection of claim 4 above, however, it does not expressly disclose that wherein said side wall frame has with a transmitting window for taking light into the enclosure.

52. One of ordinary skill would understand that light may enter the enclosure through any light transmitting surface as long as the light is incident on the photo cathode. Whether the light is transmitted through the top substrate, bottom substrate or sidewalls is a matter of design choice.

53. At the time of invention, it would have been an obvious design choice for a person having ordinary skill in the art to construct the Then photomultiplier so that the

side wall frame has with a transmitting window for taking light into the enclosure, as long as the light is incident on the photocathode.

54. **Claims 12 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Then, as applied to claims 4 and 14 above, in view of itself.**

55. **With regard to claim 12,** Then, disclose all of the limitations, as discussed in the rejection of claim 4 above, however, it does not expressly disclose that wherein said side wall frame has a transmitting window for taking light into the enclosure.

56. One of ordinary skill would understand that light may enter the enclosure through any light transmitting surface as long as the light is incident on the photocathode. Whether the light is transmitted through the top substrate, bottom substrate or sidewalls is a matter of design choice.

57. At the time of invention, it would have been an obvious design choice for a person having ordinary skill in the art to construct the Then photomultiplier so that the side wall frame has a transmitting window for taking light into the enclosure, as long as the light is incident on the photocathode.

58. **With regard to claim 22,** Then, disclose all of the limitations, as discussed in the rejection of claim 4 above, however, it does not expressly disclose that wherein said side wall frame is formed with a transmitting window for taking light into the enclosure.

59. One of ordinary skill would understand that light may enter the enclosure through any light transmitting surface as long as the light is incident on the photocathode. Whether the light is transmitted through the top substrate, bottom substrate or sidewalls is a matter of design choice.

60. At the time of invention, it would have been an obvious design choice for a person having ordinary skill in the art to construct the Then photomultiplier so that the side wall frame is formed with a transmitting window for taking light into the enclosure, as long as the light is incident on the photocathode.

Conclusion

61. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas A. Hollweg whose telephone number is (571) 270-1739. The examiner can normally be reached on Monday through Friday 7:30am-5:00pm E.S.T..

62. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

63. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TH/

/NIMESHKUMAR D. PATEL/
Supervisory Patent Examiner, Art Unit 2879